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KURDISTÁN  
and part of  
PERSIA,  
to illustrate the routes of  
Lt. Col. Shiel, Major D'Arcy Todd,  
& Mr. T. Thomson,  
1838.

English Miles

Level of Tehran 3000 feet





VI.—*An Account of the Ascent of Mount Demávend, near Tehrán, in Sept., 1837.* By W. TAYLOR THOMSON, Esq., serving in Persia; with Notes by W. AINSWORTH, Esq., M.R.G.S., &c. Read, Jan. 8, 1838.

Sept. 4.—Having received the sanction of His Excellency the Ambassador, I started from Gúlúhek, about seven miles north of Tehrán, with the intention of attempting the ascent of the peak of Demávend. My object in doing so, was to endeavour to fix by astronomical observations, the position of the mountain, which from its superior height and peaked summit, forms an excellent point for correcting the bearings taken while surveying the adjacent country. I also intended taking a correct series of bearings and angular distances, to assist in laying down a plan of the country of Mázanderán, and by barometric observations to determine the altitude of the Peak; and lastly, to make any general observations as to the geological structure and mineral productions of the mountain, which might occur to one who does not possess more than an ordinary knowledge of that subject.

In any European country, the ascent of a mountain of equal altitude with this, would be attended with no greater difficulty than a little exertion of physical force, but here it is very different; the great obstacle to be overcome is the suspicion and jealousy of the natives, who suppose that a European can have no other object in making such an exertion of strength, than by his superior knowledge to discover some hidden stores of metals and wealth. On this account no European had hitherto succeeded in making the ascent; but through the foresight and prudent arrangements of the ambassador, in my case that difficulty was overcome.

On my arrival at Ask, a village about 42 geographical miles east-north-east of Tehrán, situated on the left bank of the river Herház, and at the foot of the mountain, I delivered the letter and presents with which the ambassador had provided me, to the mother of 'Abbás Kuli Khán, the chief of Láriján (who was absent), and arrangements were immediately made to furnish me with guides and whatever was necessary for the ascent. From Ask I proceeded to Germah about an hour distant, and the highest village on the south side of the mountain, where I was provided with four guides, only one of whom, I afterwards found, had previously made the ascent. On the morning of the 8th, I ascended two hours beyond Germah; but the weather, which had all along been lowering and sultry, broke into heavy rain accompanied with thunder, which forced us to take a partial shelter under a ledge of rock, where we remained during the rest of the day and succeeding night. In the morning, the snow line which had been the night before a long way above us, now reached to

within a few feet of the place where we had bivouacked. During the night the storm had expended itself, and notwithstanding the cold and wetting we had got, we started with daylight in high spirits and with strong expectations of reaching the summit about noon.

I had been informed that there was a cave at the top of the mountain, where, if pressed for time, I might remain during the night. I therefore provided myself with a change of clothes, and four days' provision of bread for the whole party, and determined on remaining on the top for that time, in case the weather should prove cloudy. I had not ascended however above an hour, when two of the men refused to go any farther, and in consequence, the provisions and additional articles of dress had to be left with them. With the remaining two I continued the ascent, and although one of them made great complaints of pain in his head, and palpitation of the heart, he was too necessary to allow him to return. By dint of promises of reward, and threats of representing his conduct to the Khán, I succeeded in getting him to the top. It was evening, however, before we reached it, and as the cold was excessive, as soon as we had done so, we repaired to the sulphur cave, which is on the east side, and within a few feet of the summit. The cone, for about 100 feet from the top, is entirely composed of a soft rock, from which the pure sulphur is dug, with the assistance of a piece of stick, and afterwards carried down in bags on the shoulders of the men who gather it. Long before our arrival at the top, the whole mountain was wrapped in clouds, which rendered it impossible to make any observation, except barometrical, even had I been willing to risk the danger of exposing the body, while in a heated state, to the piercing cold wind which blew from the Caspian sea, distant 50 miles north. The cave is of small dimensions, having two divisions; the inner one, which is the largest, will not contain more than five or six men, and in it the temperature is very high, so much so, that in one corner I could not bear to expose my hand to the hot current of air which flowed from the rock. The whole of the bottom of this part of the cave is highly heated. On entering, we scraped together a quantity of the dust, and stripping off our goats'-hide shoes, and goats'-hair stockings, which were wet with passing through the snow, we covered our feet with the ashes, which kept them sufficiently comfortable during the night. In the outer division, where I made observations of the altitude with the barometer, the temperature was at 56° of Fahrenheit, but this was at least 20° below that of the place where we slept.

The mouth of the cave is so low, as to oblige one to enter on all-fours, but as it opened to the east, and the wind blew the fine

particles of snow into the interior of the cave, they were immediately melted, and fell upon us like a heavy dew. In the morning, my caoutchouc cloak and clothes, with the exception of the side which came in contact with the bottom of the cave, were completely drenched—had we ventured to close the entrance, we must have soon been suffocated from breathing a heated atmosphere highly impregnated with sulphureous particles—even as it was, we all awoke with severe headache and sickness.

The sun in the morning shone clear into the mouth of the cave, and when I supposed that it had reached a sufficient altitude to make the cold endurable, I went out with the intention of proceeding with the observations, but before I had gone a few yards from the mouth of the cave, my cloak and clothes being full of moisture, were frozen stiff, and the wind felt so piercingly cold, that a few minutes' rest would have benumbed us; so that, however much I regretted it, and however anxious I was not to leave the place without finishing what I intended, yet I was obliged to run at full speed down the side of the mountain to prevent being frozen. Had the four guides who started with us from Germah accompanied us to the top, the additional clothing which they carried might have enabled us to stand the cold at the summit; but I would recommend to any one making the same trip, to do it two months earlier in the season. By leaving the cave at the foot of the mountain, about twelve o'clock on a moonlight night, he would be enabled to pass nearly the whole day on the summit, without exposing himself to the noxious and heated vapour of the cave, on leaving which, at any season, there is so sudden a transition from a high to a low temperature, as to endanger very much the health of the person doing so.

As to the volcanic nature of the mountain\* there can be no doubt. The sulphureous cone with its crater-shaped summit, the heated air and steam issuing from its crevices, the hot springs at its base, the scorix and pumice found upon its side—all show, that it not only was, in former times, the mouth of an extensive volcanic district, but that its fires are not yet extinguished—again they may be lit up, and its action, whether by earthquake or eruption, may cause most extensive changes on the surface of this part of the country. The volcanic action through the whole of this part of the country has at one time been very great; strata of rocks are contorted and twisted about in all directions. In the neighbourhood of Germah are the hot springs of Germásir, the

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\* We learn from Mr. Baillie Fraser that on approaching the mountain from the west, after leaving the limestone mountains that surround it, he found a large inclined plain below the cone, covered with pumice-stone and scorix, and having dark basaltic rock starting up through them to the surface; the cone seemed to consist of pumice and scorix, with debris of basalt, and the ridges and peaks of the latter stared through the surface all the way to the summit.—Ed.

hottest of which shows a temperature of 148° of Fahrenheit. The springs, however, are not confined to this place alone; at Ask they are very numerous, both in the village and its neighbourhood, although they are of a temperature much inferior to those of Germsir.

On my return from the top of the mountain to Gúlúhek, I passed through Rayrah, Ask, village of Demávend, Abú-mehán, and Jájrúd, making a sketch survey of the country as I passed along. I annex a table of barometric observations made at different stations, and a section of the rocks from the base at Germah to the top of Demávend [see Map].

	Barom. Eng. inches.	Therm. Fahr.
Lavassán . . . .	23. 1	75°
Ask . . . . .	24. 11	71
Germah . . . . .	23. 2	68
Demávend Peak (sulphur cave)	15. 05	56
Demávend village . . .	23. 45	66
Jájrúd . . . . .	25. 03	81
Tehrán . . . . .	25. 97	80

The geological formation of Demávend immediately about Germah would seem to be a deposit of calcareous tufa—above this occur beds of sandstone of the coal formation, with one seam of coal of inferior quality, for about 1000 feet—then limestone for a thickness of nearly 1200 feet; above this again, greenstone coloured with iron, to within 100 feet of the summit, which is a deposit of pure sulphur.

At the request of Mr. Thomson, Mr. Ainsworth adds the following remarks:

The mean height of the barometer at the level of the Persian Gulf, in the month of September is, from my own observations, as much as 30.600 inches, which compared with the observations made by Mr. Thompson, would give a rough amount of 4,300 feet elevation to Tehrán, and 15,000 to the cave near the summit of the Demávend; but there can be no doubt that this mean is much too high for the latitudes of the Persian Taurus, and probably the best approximate mean would be obtained by taking the difference between the mean of the level of the sea in our own latitudes, or 29.600, and that of the Persian Gulf, which would give 30.100; and hence the elevation of Tehrán would be 4,000 feet; of Jájrúd, 4,900; of Lavassán, 6,800; of Ask, 5,800; of Germah, 6,700; of Demávend village, 6,000; and of the cave near the summit of the peak, 14,700.

It is to be observed here, that there are no corrections except for temperature, and hence, if these elevations approximate to

within 100 feet of the truth, it is the most that can be expected of them. They serve to give a good idea of the height of what may probably be considered as the culminating point of the Persian Taurus; and it is to be hoped that the Society will, before long, be in possession of more accurate observations.

The geological observations made by Mr. Thomson possess great interest by establishing the existence of a pseudo-volcano in these central districts of Western Asia, and ally themselves to the observations which the Baron von Humboldt has made upon the evidences of volcanic action, whether in ignivomous mouths, (extinct or active,) or canals of communication between the surface and the interior of the earth, and of the same action as evidenced in lines or circles of elevation, and which he has traced throughout the great continent of Asia. The geological relations of the Caspian sea are connected with the same phenomena, belonging, as they undoubtedly do, to the latest changes which have taken place on the surface of the earth.

It is a remarkable fact, that throughout those districts of Taurus, Amanus, Kurdistan, and the Persian Apennines, (Bakhtiyári-Luristán mountains.) which I have travelled, I have never as yet met with rocks of the secondary series. The absence of every member between the chalk and the primary formations is one of the most remarkable features in the geology of Western Asia, and from this phenomenon obtaining so very generally over such extensive districts, it is most probable that the sandstones which occur at the base of Demávend belong to the supracretaceous or tertiary series, and are either sandstones with lignite coal belonging to the plastic clay, (the ostracite sandstone of Kupffer,) or what is equally probable, belong to the *Terrain marno-charboneux* of Brogniart. As there are no fossils transmitted, it is impossible to determine the age of the superimposed limestones. The sulphur deposits of Músúl in Mesopotamia, and of Sú Khúmatú in Kurdistan, are both of them in the Cerithia limestone, corresponding to the London clay; but the sulphur formation of the Demávend appears to be of even a more recent date.

Mr. Thomson found thermal springs in the neighbourhood of Germah, in one of which the thermometer of Fahrenheit indicated a temperature of 148°. I observed a curious phenomenon in some of the thermal springs in Syria, not far from Antioch, which, according to a well-authenticated tradition, had made their appearance at different times, and with different shocks of earthquakes, so frequent in those countries, viz., that the temperatures of the most recent springs exceeded by several degrees those of the most ancient ones. I shall call the attention of my friend, Mr. Thomson, to this fact, in order that he may observe if any law of a decreasing temperature in thermal springs can be esta-



blished by observations made in different sources, in different countries, and during a prolonged period of time.

With regard to the rocks designated as green-stone in the above account, their position is very various in Western Asia. I have, however, never observed rocks of augite and feldspar, or other rocks which are more modern than the hornblend series, intercalated in, or tilting up very recent sedimentary formations, as is the case with the diallagic formations; but it is very evident that the connexions are no longer the same where these rocks are associated with pumice-stone and scorix, as in the Demávend, just as the same rocks are, near 'Osmánjik in Taurus from my own observations, associated with argillaceous rocks containing mica and vitreous feldspar.

VII.—*Abstract of the Historical Evidence for the Discovery of America by the Scandinavians in the Tenth Century.* Extracted from the "ANTIQUITATES AMERICANÆ."

[THE labours of the Royal Society of Northern Antiquaries at Copenhagen have long since obtained for them an honourable station in the republic of letters, but the recent publication of the work named "ANTIQUITATES AMERICANÆ" entitles them to the gratitude of the whole civilized world. Rumours of the fact that the Scandinavian Northmen were the original discoverers of America have long been prevalent, and several Icelandic authors of great intelligence and respectability have investigated the subject of western discovery by their adventurous countrymen; but it has been well observed by Baron Humboldt, that the information which the public as yet possesses of that remarkable epoch in the middle ages is extremely scanty, and he has expressed a wish that the northern literati would collect and publish all the accounts relating to the subject. To that wish the Royal Society of Northern Antiquaries has fully responded, and the result is this collection of documents compiled from the numerous and valuable MSS. now extant, and accompanied by a Danish and also a complete Latin translation—by prefatory remarks and archæological and geographical disquisitions—and further, by an abstract of the historical evidence in English.

As such a subject must deeply interest all those who occupy themselves with ancient discoveries in geography and history; and as from the nature of the work its circulation will be extremely limited, it has been considered that an abstract of the historical evidence would appropriately find its place in the London Geographical Journal, with the two-fold object of more widely diffus-